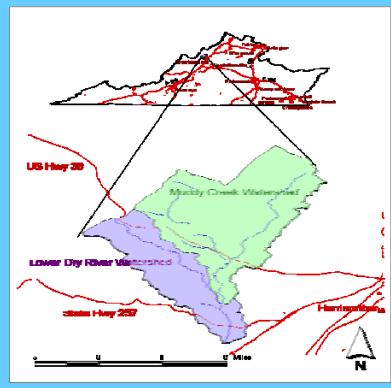
The Success of Conservation Stewardship in Virginia:
The Shenandoah Valley's Muddy Creek and Lower Dry River Watersheds

Project Background

Muddy Creek and Dry River are located in Virginia's Shenandoah Valley in Rockingham County approximately five miles west of the City of Harrisonburg. Both streams drain into the North River, which empties into the South Fork Shenandoah River. Rockingham County is listed as the leading poultry producing county in the nation. Due to the intensity of agriculture in these watersheds (poultry and dairies), significant loads of bacteria were identified from pasture and cropland runoff, and from livestock in streams. In addition, failing septic systems and straight pipes were identified as significant sources of bacteria in the watersheds. The Muddy Creek and Lower Dry River areas are home to a large Old Order Mennonite community that has historically installed best management practices voluntarily without accepting cost share assistance. Agriculture is a predominant source of bacteria in Muddy Creek and Dry River. According to estimates in the TMDLs developed for these watersheds, direct deposit of waste by livestock in streams constitutes approximately 87% of the direct fecal coliform loads in Muddy Creek and 98% of the load in Dry River. It is estimated that 74% of the nonpoint source load in Dry River comes from pasture land, while pasture land contributes approximately 54% of the load in Muddy Creek. The TMDL calls for a 99% reduction in direct deposition of waste from livestock in stream, and a 100% reduction in uncontrolled discharges, which are illegal in the Commonwealth of Virginia. According to the TMDL Implementation Plan it is estimated that a total of 44 miles of stream fencing will be necessary to achieve these reductions in Muddy Creek, while 20 miles will be needed in Dry River.



Alternative waste treatment system in Muddy Creek

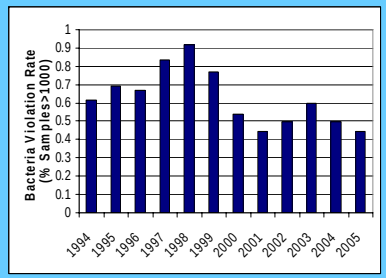
Project Highlights

Residential and agricultural successes have largely been the result of partnerships between the Shenandoah Valley Soil, Water Conservation Districts and state agencies including the Virginia Departments of Conservation and Recreation and Environmental Quality, Virginia Cooperative Extension, Rockingham County Farm Bureau, and USDA-Natural Resources Conservation Service. Since there is such a high livestock density per acre in the Muddy Creek and Lower Dry River watersheds and numerous dairy farm operations in close proximity to a stream, the installation of loafing lot systems with loose housing has helped to control runoff of manure and sediment to the streams. The two biggest advantages of the installation of agricultural BMPs in the Muddy Creek and Lower Dry River areas are being able to store and better utilize nutrients and exclude livestock from streams. Since the initiation of the implementation project, there has been ten miles of exclusion fencing installed in the Muddy Creek and Lower Dry River watersheds along with an average of 1200 acres per year of cover crops planted for uptake of nutrients. Over 80% (8.3 miles) of the exclusion fencing installed in the watersheds was done voluntarily without the use of cost share funds. Homeowners have also played a large role in the improvements made in water quality in these areas. Over the past two and a half years, there have been thirty septic tank pump-outs, thirteen septic system repairs and replacements, and five alternative waste treatment system installations to replace failing septic systems. Significant improvements in fecal coliform counts have been observed in both streams since implementation efforts began in 2001, with Dry River approaching fecal coliform levels necessary for de-listing. In addition, substantial improvements have been observed in the benthic community in Muddy Creek, indicative of reduced stress on the aquatic community due to decreased sediment and phosphorous levels in the water.

Result

Voluntary livestock exclusion fencing in Muddy Creek

According to DEQ monitoring data throughout the Shenandoah Valley from 1995-2000 and 2000-2004 (47 stations total), Dry River ranked as the 5th most improved stream and Muddy Creek the 6th most improved in the Valley. Significant improvements in violation rates of the 1,000 colony forming units/100ml instantaneous standard for fecal coliform have since been observed, with Muddy Creek dropping from a high of a 91% violation rate in 1998 to a 44% violation rate in 2005. Similar improvements were observed in the Dry River, which dropped from its highest violation rate of 50% in 1996 to 11% in 2005. Significant improvements have also been observed in the benthic community in Muddy Creek, which received a stream health score of slightly impaired in 2004 (77). This score is up from a low of severely impaired (16) in 1999. These improvements are indicative of reduced stress on the benthic community from nitrate loading in Muddy Creek. Probably the best news in monitoring results is the trend in the North River itself; of the 13 samples collected in the past two years (2004 and 2005), there have not been any violations of the bacteria water quality standard. Several partners have contributed to the success of this project including the Shenandoah Valley Soil and Water Conservation District, Virginia Department of Conservation, Recreation, Virginia Department of Environmental Quality, Virginia Cooperative Extension, Rockingham County Farm Bureau, and Natural Resources Conservation Service. In addition to these partners, the Old Order Mennonite community in which extensive voluntary BMP's, such as stream exclusion and crossings, loose housing barns, and numerous manure storage units have been installed have displayed a stewardship ethic in implementing pollutant source reductions. These practices have greatly influenced improvements in water quality seen through the TMDL implementation project. Due to religious beliefs, this community does not accept any financial assistance for installing BMP's. However, the community strongly recognizes the connection between land use and water quality and took the initiative to install environmentally friendly practices to control runoff from nutrients and sediment from entering the streams.



Violation rate of the 1,000 colony forming units/100ml instantaneous standard for fecal coliform in Muddy Creek.

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